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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/536,820	03/27/2000	Fu Jie Huang	MCS-101-99	4653

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EXAMINER

KIBLER, VIRGINIA M

ART UNIT	PAPER NUMBER
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2623

DATE MAILED: 08/13/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/536,820

Applicant(s)

HUANG ET AL.

Examiner

Virginia M Kibler

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,5-10,15-20,25-29 and 31-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5,6,9,10,15,16,19,20,25,26,29 and 31 is/are rejected.
- 7) ☒ Claim(s) 7,8,17,18,27,28 and 32-34 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1,5, 10, 15, 20, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arbuckle (5,842,194) in view of Niyogi et al. (6,345,110).

Regarding claim 1, Arbuckle discloses a face recognition process including creating a database of a plurality of model image characterizations, each of which represents the face of a known person that it is desired to identify in the input image (Col. 1, lines 17-23). Arbuckle further discloses training a neural network ensemble to identify a person from a region which has been extracted from the input image and characterized in a manner similar to the plurality of model images (Col. 9, lines 39-67), wherein the network ensemble comprises, a first stage having a plurality of classifiers each of which has input and output units and outputs a measure of the similarity indicative of the similarity between the characterized input image region and each of the model image characterizations (Abstract, lines 5-15), and a fusing neural network as its second stage which combines the outputs of the classifiers to generate an output indicative of the person associated with the characterized image region (Abstract, lines 15-24), and employing the network ensemble to identify the person associated with the characterize input image region (Abstract, lines 1-5). Arbuckle discloses each classifier being dedicated to a particular resolution rather than a person's face pose. However, Niyogi et al. ("Niyogi") teaches that it is known to

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create a training set or “database” associated with a person’s face pose (Col. 3, lines 22-28).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the database and the classifiers disclosed by Arbuckle to include a person’s face pose, as taught by Niyogi, in order to analyze an image of a person in different positions (Col. 1, lines 21-24).

Regarding claim 5, Arbuckle discloses training the neural network ensemble including preparing each model characterization from a model image depicting the face of a known person that it is desired to identify in the input image by normalizing the extracted portion of the model image by resizing it to a prescribed scale if not already at the prescribed scale (Col. 10, lines 1-8). Arbuckle does not appear to recognize normalizing so that the eye locations of the depicted subject fall within a prescribed area and cropping the extracted portion of the model image by eliminating unneeded portions of the image not specifically depicting part of the face of the subject to create a model face image. However, Niyogi teaches that it is known to normalize the extracted portion by adjusting the region so that the head 2 which includes the eye locations of the depicted subject fall within a prescribed area 410 (Figure 4). Niyogi also teaches that it is known to crop the extracted portion of the model image by eliminating unneeded portions of the image not specifically depicting part of the face of the subject to create a model face image (Col. 4, lines 21-30). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the preparing of the model disclosed by Arbuckle to include adjusting and cropping, as taught by Niyogi, in order to eliminate erroneous results.

Regarding claim 10, the arguments analogous to those presented above for claim 1 are applicable to claim 10. Note, Arbuckle discloses implementation with a computer (Abstract, line

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1), which would thereby entail a computer program. Arbuckle discloses capturing model images each of which depicts at least one person of known identity (Col. 13, lines 58-61). Arbuckle does not recognize locating and extracting regions, determining the face pose, and categorizing each face region. However, Niyogi teaches that it is known to locate and extract regions within the model images (Col. 4, lines 22-60), determine the face pose (Col. 3, lines 10-11), and categorizing each face region by assigning each to one of a set of pose ranges (Figure 2) into which its associated face pose falls (Col. 3, lines 32-34). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the neural network ensemble disclosed by Arbuckle to include locating and extracting regions and categorizing each face region, as taught by Niyogi, in order to analyze people in different positions.

Regarding claim 15, the arguments analogous to those presented above for claim 5 are applicable to claim 15.

Regarding claim 20, the arguments analogous to those presented above for claim 10 are applicable to claim 20.

Regarding claim 25, the arguments analogous to those presented above for claim 5 are applicable to claim 25.

3. Claims 6, 9, 16, 19, 26, 29, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arbuckle (5,842,194) in view of Niyogi et al. (6,345,110) as applied to claim 1 above, and further in view of Turk et al. (5,164,992).

Regarding claim 6, Arbuckle does not recognize categorizing the model face images by assigning each to one of a set of pose ranges into which its associated face pose falls. However, Niyogi discloses categorizing the model face images by assigning each to one of a set of pose

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ranges (Figure 2) into which its associated face pose falls (Col. 3, lines 32-34). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the training of the neural network ensemble disclosed by Arbuckle to include categorizing the model face images as taught by Niyogi in order to analyze images of people in different positions. Niyogi further discloses choosing a prescribed number of model face images of each person being modeled which have been assigned to the selected pose range (Col. 3, lines 49-50). Niyogi discloses using PCA (Col. 4, lines 2-4), but does not explicitly state the described details. However, Turk teaches that it is known to concatenate each of the chosen model face images to create a respective dimensional column vector for each (Col. 3, lines 49-65), compute a covariance matrix from the DCVs (Col. 4, lines 1-7), calculate eigenvectors and the corresponding eigenvalues from the covariance matrix (Col. 4, lines 3-7), rank the eigenvalues in descending order and identify a prescribed number of the top eigenvalues (Col. 4, lines 30-37), use the eigenvectors corresponding to the identified eigenvalues to form the rows of a basis vector matrix (Col. 6, lines 57-60), and multiplying each DCV by each BVM to produce a set of PCA coefficient vectors for each model face image 104 (Figure 2). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the use of PCA disclosed by Arbuckle and Niyogi to include the details mentioned above, as taught by Turk, in order to define the variation among the face images (Col. 4, lines 3-7).

Regarding claim 9, Turk discloses designating the input image region to be an unknown person determined by a prescribed threshold based on the degree of similarity between the characterized input region and the most closely matching model image characterization does not exceed the prescribed threshold (Col. 5, lines 8-12). Turk discloses the implementation of a

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neural network to identify an unknown person (Col. 10, lines 23-28) which would thereby entail training and employing the neural network.

Regarding claim 16, the arguments analogous to those presented above for claim 6 are applicable to claim 16. Turk does not disclose repeating the actions for each pose. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the training disclosed by Turk to include repeating for each pose taught by Niyogi in order to provide training associated with each pose.

Regarding claim 19, the arguments analogous to those presented above for claim 9 are applicable to claim 19.

Regarding claim 26, the arguments analogous to those presented above for claim 16 are applicable to claim 26.

Regarding claim 29, the arguments analogous to those presented above for claim 9 are applicable to claim 29.

Regarding claim 31, the arguments analogous to those presented above for claims 5 and 6 are applicable to claim 31.

Allowable Subject Matter

4. Claims 7,8,17,18,27,28, and 32-34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Contact Information

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Virginia M Kibler whose telephone number is (703) 306-4072. The examiner can normally be reached on Mon. -Thurs. 8:00 - 5:30 and every other Friday.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 308-6604. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.

VK

July 30, 2003


AMELIA M. AU
SUPERVISORY PATENT EXAMINER
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